

REMARKS

The Office Action dated February 12, 2007, has been received and carefully noted. The following remarks are submitted as a full and complete response thereto.

Claims 6 and 7 were withdrawn pursuant to the Election of Species Requirement dated April 25, 2006. Accordingly, claims 1-5 are respectfully submitted for consideration.

Rejections Under 35 U.S.C. § 102 and § 103

Claims 1-3 were rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Nakajima (U.S. Patent No. 6,452,775 B1), Krishnaraj et al. (U.S. Patent No. 6,175,485 B1, "Krishnaraj") or Collins et al. (U.S. Patent No. 5,350,479, "Collins"). Claims 2 and 3 depend from claim 1. The Office Action asserted that Nakajima, Krishnaraj and Collins disclose the claimed features of the invention and that the claimed ratio of oxygen to metal is inherent in the prior art references. See page 3, lines 3-6 of the Office Action. The Applicants respectfully submit that Nakajima, Krishnaraj and Collins fail to disclose or suggest the claimed features of the invention.

Claims 1, 2 and 4 were rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Amano et al. (U.S. Patent No. 4,774,150, "Amano"), Hasz et al. (U.S. Patent No. 5,773,141, "Hasz") or Yasuda et al. (U.S. Patent No. 5,955,182, "Yasuda"). Claims 2 and 4 depend from claim 1.

Claims 1, 2 and 5 were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Amano, Sahoo et al. (U.S.

Patent No. 5,993,976, "Sahoo") or Goedjen et al. (U.S. Patent No. 6,306,515 B1, "Goedjen"). Claims 2 and 5 depend from claim 1.

Claim 1 recites a sprayed coating formed by plasma spraying inside a semiconductor processing device, the coating comprising a metal oxide composed of oxygen and a metal, or a semiconductor oxide composed of oxygen and a semiconductor. A composition ratio of the oxygen with respect to the metal or the semiconductor is not less than 80% of a composition ratio of the stoichiometric composition.

The Applicants respectfully submit that none of the cited references disclose a plasma operating gas including oxygen, and a control of the ratio of oxygen composition to realize the composition having a theoretical stoichiometric composition as recited in claim 1.

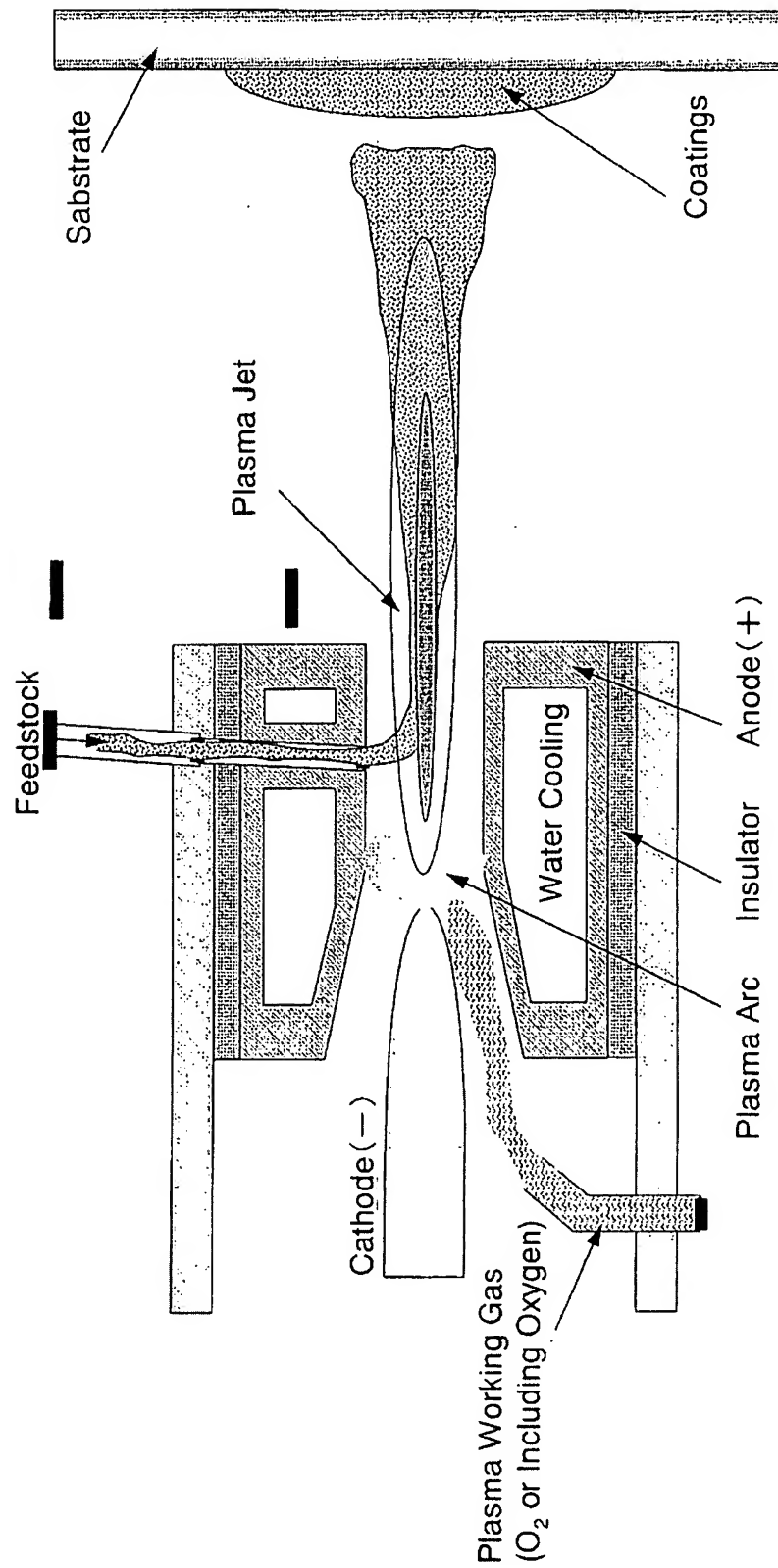
As set forth in the "Practical Examples" and "Comparative Examples" beginning on page 7 of the specification of the present application, the sprayed coating in which oxygen or gas containing oxygen is not used, has a composition ratio of oxygen less than 80%.

The coating of the present invention solves the problem of electrical insulation and corrosion resistance. In contrast, the coatings disclosed in the cited references are TBCs (thermal barrier coatings) and coatings having abrasion resistance or the like, which serve a different purpose from the coating of the present invention. As such, the coatings disclosed in the cited references are merely required to have heat resistance, abrasion resistance or the like. Therefore, accurate measurement of the composition ratio of oxygen to metal is not required or disclosed. As a result, the cited references do

not address the problem of decreasing in stoichiometric composition in plasma spraying without using oxygen or a gas including oxygen. The cited references merely disclose a metal oxide coating having stoichiometric composition of 100%. That is, since a precise oxygen composition is not required in any of the cited references and the problems of electrical insulation and corrosion resistance solved by the present invention are not disclosed, the cited references merely teach a chemical formula of a metal oxide.

To establish that the claimed sprayed coating has a composition ratio of oxygen with respect to the metal or the semiconductor being not less than 80% of a composition ratio of the stoichiometric composition and that the sprayed coating formed by the plasma spraying in condition of the cited references have a composition ratio of the oxygen with respect to the metal or the semiconductor being less than 80% of a composition ratio of the stoichiometric composition, the Applicants performed the experiment disclosed beginning on page 7 of the specification. The Applicants provide herewith a representative drawing which helps understanding the plasma operating gas is attached in this document.

Plasma Spray Coatings with Working Gas of O₂ or Including Oxygen



Schematic diagram of cross section of Plasma Spray Torch

As shown in Tables 1 to 3 of the specification of the present application, when plasma spraying was performed without using the plasma operating gas of oxygen or gas including oxygen, as disclosed in the cited references, a composition ratio of the oxygen with respect to the metal or the semiconductor was less than 80% of a composition ratio of the stoichiometric composition.

With respect to the rejection of claim 1 in view of Nakajima, the Applicants respectfully submit that the coating of Nakajima is for an electrostatic chuck in which desorption responsiveness is improved. As such, the purpose of the coating in Nakajima is different from that of the present invention. In addition, although Nakajima discloses plasma spray coating, the high purity barrier layer 105 is disclosed as having a purity of at least about 99.99%, which cannot be formed by the plasma spray coating in which a plasma operating gas in which oxygen is not used. The value of "at least 99.99%" disclosed in Nakajima means that metal oxides having a purity of at least 99.99% are used as raw materials of plasma spraying, and does not mean that the coating formed by the plasma spray coating has 99.99% of stoichiometric composition, as required by claim 1.

With respect to the rejection of claim 1 in view of Krishnaraj, the Applicants respectfully submit that since a detonation gun 100 is used in Krishnaraj, the spraying process is an explosion spraying, which is not comparable to the claimed plasma spraying. Thus, the process of forming a coating in Krishnaraj is different from that of the present invention as claimed in claim 1. Moreover, the metal element is doped in the coating of Krishnaraj. See column 1, lines 65-67 of Krishnaraj. As such, the coating

of Krishnaraj is not comparable to the coating of the present invention, as recited in claim 1.

With respect to the rejection of claim 1 in view of Collins, the Applicants respectfully submit that the coating of Collins is applied to an electrostatic chuck, for a purpose which is different from that of the present invention. Therefore, as discussed above, accurate measurement of the composition ratio of oxygen to metal is not required or disclosed. As a result, Collins does not address the problem of decreasing stoichiometric composition in plasma spraying without using oxygen or a gas including oxygen. The plasma treatment in Collins is used in a treatment of wafer, and is not comparable to the claimed plasma spraying, recited in claim 1.

With respect to the rejection of claim 1 in view of Amano, the Applicants respectfully submit that the coating of Amano is for TBC, the purpose of which is different from that of the present invention in which problem of electrical insulation and corrosion resistance are important. Moreover, the Applicants respectfully submit that a luminous activator is added in the coating of Amano. See at least the Abstract of Amano. Therefore, the coating of Amano is different from the coating of the present invention as recited in claim 1.

In addition, the Office Action asserts that Amano discloses the coating of Y_2O_3 . However, Y_2O_3 is a stabilizing agent added to coating of ZrO_2 . Therefore, Amano does not disclose or suggest that the metal oxide is Y_2O_3 as recited in claim 5.

With respect to the rejection of claim 1 in view of Hasz, the Applicants respectfully submit that the coating of Hasz is for a TBC. Thus, the purpose of the coating in Hasz is different from that of the coating in the present invention. Oxide

ceramics such as Al_2O_3 , MgO or the like in Hasz are used to protect the TBC, and form a coating based on the assumption that the ceramic coating will react with contaminated matter to protect the TBC. Conversely, in the present invention, coating of metal oxide or semiconductor oxide exhibits high electrical insulation and corrosion resistance by having stoichiometric composition of oxygen not less than 80%. As such, Hasz does not disclose or suggest the features of the invention as recited in claim 1.

With respect to the rejection of claim 1 in view of Yasuda, the Applicants respectfully submit that in Yasuda discloses low-pressure spraying as opposed to spraying in the air, to form a coating having high hardness and density. Characteristics of the coating required to be improved (such as hardness, density or the like) in Yasuda are different from the characteristics of electrical insulation and corrosion resistance as disclosed in the present invention. Thus, not only are the required characteristics of Yasuda different from the present invention, but also the process of low-pressure spraying for achieving the characteristics are different from the present invention.

With respect to the rejection of claim 1 in view of Sahoo, the Applicants respectfully submit that the coating of Sahoo is for a material having abrasion resistance. As such, the purpose of the coating in Sahoo is different, as discussed above. In addition, Sahoo discloses conventional plasma spraying in which $\text{Ar}+\text{He}$ gas is used as the plasma operating gas. Since this plasma spraying is considered to be similar to the plasma spraying disclosed in the Comparative Example of the present invention in which $\text{Ar}+\text{H}_2$ is used, the coating obtained by the plasma spraying of Sahoo would contain oxygen less than 80% of stoichiometric composition. As the purpose of

the coating in Sahoo is to improve abrasion resistance, control of the composition ratio recited in claim 1 is not disclosed or suggested.

With respect to the rejection of claim 1 in view of Goedjen, the Applicants respectfully submit that the coating of Goedjen is for TBC, which, as discussed above, is a different purpose from the present invention. In addition, in Goedjen, ceramics are added to stabilize zirconia coating (TBC). Conversely, the coating of the present invention is disclosed as an oxide of metal or oxide of semiconductor (ceramics). In addition, the air plasma spraying disclosed in Goedjen is merely plasma spraying in the air and Goedjen do not disclose or suggest the plasma operating gas containing oxygen or a gas containing oxygen.

With respect to claim 5, the Applicants respectfully submit that neither Sahoo nor Goedjen disclose or suggest the claimed features of the invention. Claim 5 recites that the metal oxide is yttrium oxide. In contrast, Sahoo discloses a combination yttria and zirconia powder. Specifically, Sahoo discloses a strain tolerant ceramic coating is a yttria-stabilized zirconia coating, which comprises yttrium oxide Y_2O_3 (yttria) in a concentration between about 6 to 9 wt %, and preferably between about 7 to 8 wt %. The balance of the coating is zirconium oxide (ZrO_2) (zirconia), except for minor amounts of other constituents which may be present in the composition. See column 3, line 56 – column 4, line 14 of Sahoo. There is no disclosure or suggestion that the metal oxide is yttrium oxide. Instead, Sahoo discloses yttrium oxide in combination with zirconia, thereby, resulting in a different coating.

Similarly, Goedjen discloses a thermal barrier coating layer 10 is generally an 8% yttrium stabilized zirconia. See column 2, lines 45-55 of Goedjen. There is no

disclosure or suggestion in Goedjen of the metal oxide being yttrium oxide. Rather, Goedjen discloses a combination of yttrium and zirconia which is a different coating from that recited in claim 5. Accordingly, the Applicants respectfully request withdrawal of the rejection of claim 5 in view of Sahoo and Goedjen.

According to U.S. patent practice, a reference must teach every element of a claim in order to properly anticipate the claim under 35 U.S.C. §102. In addition, “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628,631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). “Every element of the claimed invention must be arranged as in the claim. . . . [t]he identical invention must be shown in as complete detail as is contained in the patent claim.” Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236 (Fed. Cir. 1989) (emphasis added). The Applicants respectfully submit that the cited references do not disclose or suggest the claimed features of the invention. Accordingly, the cited references do not anticipate claims 1 and 5, nor are claims 1 and 5 obvious in view of the cited references. As such, the Applicants submit that claims 1 and 5 are allowable over the cited art.

Claims 2-4 depend from claim 1 and are allowable for at least the same reasons.

Conclusion

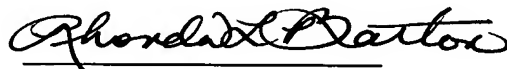
The Applicants respectfully submit that claim 1 is allowable. Claims 2-5 depend from claim 1. The Applicants further submit that each of these claims incorporate the patentable aspects thereof, and are therefore allowable for at least the same reasons as

discussed above. Accordingly, the Applicants respectfully request withdrawal of the rejections, allowance of claims 1-5 and the prompt issuance of a Notice of Allowability.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing Attorney Dkt. No. 108421-00087.**

Respectfully submitted,



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Enclosures: Request for Continued Examination
Petition for Extension of Time